

S. B. FOWLER.
THERMAL PROTECTOR.
APPLICATION FILED MAY 23, 1907.

937,062.

Patented Oct. 19, 1909.

Fig. 1.

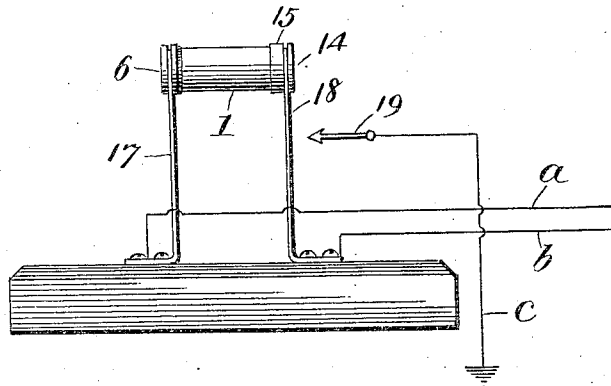
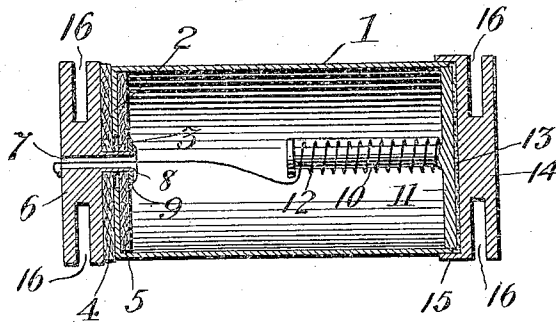


Fig. 2.



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UNITED STATES PATENT OFFICE.

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THERMAL PROTECTOR.

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Specification of Letters Patent.

Patented Oct. 19, 1909.

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To all whom it may concern:

Be it known that I, SAMUEL B. FOWLER, a citizen of the United States, residing at La Fayette, in the county of Tippecanoe and State of Indiana, have invented certain new and useful Improvements in Thermal Protectors, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to thermal protectors and especially to that class of protectors which are used in telephone or telegraph systems for preventing the access of abnormally strong currents to the instruments employed.

Heretofore it has been almost impossible to utilize heat coils of the non-resoldering type after their first operation, and where this result has been accomplished the resoldering of the parts has consumed considerable time and therefore rendered the operation expensive.

My invention is designed to obviate these difficulties and to provide a device which may be readily and easily resecured in operative position. The invention employs a protector of the type specified which involves an improved heat concentrating device included with other means in the telephone or telegraph circuit so that upon an abnormally strong current passing through the heat concentrating device, the associated means is released therefrom and a connection with the ground is automatically established. With this arrangement currents dangerous to the instruments of the switchboard and other parts of the system are prevented from obtaining access thereto. The connection to earth when established thus prevents any trespassing current from doing any damage.

My invention is illustrated in the accompanying drawings in which—

Figure 1 is a side elevation showing diagrammatically the mounting and circuit connections of the device. Fig. 2 is a longitudinal section through the heat coil.

Referring to the drawings, 1 represents a metallic shell of cylindrical shape which is flanged at one end thereof at 2 with a central aperture 3 of relatively large diameter. Disposed on either side are fiber washers 4 and 5 having apertures registering with, but of smaller diameter than the aperture 3. In

other words the edges of the apertures in the disks 4 and 5 project beyond the edges of the aperture 3. Abutting against the outer washer 4 is a terminal head 6 having a central bore 7 and a projecting tubular member 8 which passes through the aperture of the disk 4, the aperture 3 of the shell and the aperture of the disk 5. Surrounding the projecting end of the tubular portion 8 is a small metallic washer 9 which lies against the disk 5 and is held in position thereagainst by upsetting the outer end of the tubular portion 8. This construction effectually secures the head 6 to the shell 1 and at the same time effectually insulates it therefrom.

Projecting into the shell is a core 10 integral with a disk 11 which has a driving fit in the shell 1, and surrounding the core is a winding of fine German silver wire 12 soldered at one end with hard solder to the disk 11 and having its opposite end extending beyond the end of the core and being securely soldered with hard solder to the head 6. The outside surface of the disk 11 is coated with a suitable low fusing material 13 such as soft solder, low fusing cement or like material. A head 14 somewhat similar to the head 6 but provided with an annular flange 15, has its inner surface engaging and secured to the fusible material 13 with its flange 15 overlapping the shell 1.

Both of the heads 6 and 14 are provided with annular grooves 16 adapted to be engaged by the line springs 17 and 18, which have a normal tension in opposition to each other. These springs we shall say are connected to the line wires *a* and *b* respectively, and the spring 18, when the device is operated, engages a contact 19 connected by line wire *c* to the ground. This contact is here shown diagrammatically but it will be understood it can be mounted or secured in any suitable way upon the base or support, here also shown very simply for purposes of illustration. With this arrangement all currents traveling over the circuits *a—b* are compelled to pass through the fusible material 13 and through the resistance winding 12 on the core 10. Thus it will be seen that should a current of abnormal strength pass over the wire 12 it would heat the core 10 and consequently the disk 11 to such a tem-

perature as would be calculated to soften the fusible material 13 and release the head 14 therefrom. This head being in engagement with one of the line springs and it in turn having a normal tendency to pull the head away from the shell, the head is therefore disengaged and the spring 18 by its own inherent resiliency thrown into contact with the grounded stop 19. With this arrangement the heat coil described not only responds to an unduly strong current to create a gap in the circuits so as to cut out the instruments to be protected, but at the same time affords a path for such current to ground. Furthermore after the head has once been disengaged by the fusing of the solder and the tension of the spring, it may be reattracted to the outer surface of the disk 11 by simply reheating the head 14 and pressing it into engagement with the fusible material thereon. The circuit through the device itself, after the head has been removed, is left intact and as all parts of the device, except the insulating washers 4 and 5, are metallic, it will readily be seen that the device is adapted to operate repeatedly and still be in good condition. It will also be seen that I have provided a very efficient, simple and inexpensive thermal protector which can be easily and cheaply manufactured, and I wish it understood that although I have described and shown a simple form with which to illustrate the invention, I do not wish to be limited thereto as many modifications and changes might be resorted to without departing from the spirit or scope of the invention, the broad features of which are covered in the appended claims.

40 Having thus described my invention what I claim and desire to secure by Letters Patent is—

1. A thermal protector comprising a metallic cylinder flanged at one end thereof, an insulating disk on the interior of said cylinder having an opening, another insulating disk on the exterior of said cylinder having an opening registering with the opening in the first disk, a terminal head, and means cooperating with the disks through said opening to connect the terminal head to the cylinder.

2. A thermal protector comprising a metallic cylinder flanged at one end thereof, a pair of insulating disks associated with said flange, a terminal head, and means cooperating with the disks to secure the terminal head to the cylinder.

3. A thermal protector comprising a metallic cylinder flanged at one end thereof, insulating means, a terminal head, and means carried by the terminal head and cooperating with the insulating means to secure said head to the cylinder.

4. A thermal protector comprising an

inclosing shell, a terminal head, insulating disks, and a rivet carried by the terminal head and cooperating with the disks to secure the head to the cylinder, said head being insulated therefrom by the disks.

5. A thermal protector comprising a flanged cylinder, a pair of insulating disks one on either side of the flange, a terminal head adjacent one of the insulating disks, and a rivet integral with the head and cooperating with the disks to secure said head to the cylinder, both head and rivet having a common aperture, together with circuit connections for the protector extending through said aperture.

6. In a thermal protector, the combination with an inclosing casing flanged at one end, a terminal head, insulating means, means cooperating therewith to secure said head to the casing, said securing means being apertured for the passage of a circuit wire, a heat concentrating member at the other end of said casing, a thermally secured head associated with said heat concentrating member, and circuit connections for said member extending between the heads.

7. In a thermal protector, the combination with an inclosing casing, of a terminal head secured thereto but insulated therefrom, a heat concentrating member secured in said casing, a second terminal head fusibly connected to said heat concentrating member, a core integral with said heat concentrating member, and a resistance device associated with said core and electrically connected to the member and to the insulated head, said last named connection being made through the securing means of the head.

8. In a thermal protector, the combination with a metallic cylinder flanged at one end thereof, insulating disks on either side of the flange, a terminal head adjacent the outer disk provided with a central aperture, a hollow rivet integral with said head and cooperating with said disks to secure the head to the cylinder, a terminal head secured on the opposite end of said cylinder by fusible material, and a coil of high resistance wire secured at one end to the fusibly connected head and at the opposite end through the rivet to the insulated head.

9. In a thermal protector, the combination of a metallic cylinder, a terminal head secured to one end of said cylinder but insulated therefrom, a metallic disk having a driving fit in the cylinder at the opposite end, a terminal head fusibly secured thereto, a core integral with said metallic disk, and a resistance coil wound around said core with its terminals connected to said heads.

10. In a thermal protector, a metal shell, a terminal head secured thereto but insulated therefrom, a heat concentrating member fitted within the shell, a second terminal

head fusibly connected to the heat concentrating member, and a resistance device associated with the heat concentrating member and having connection with both heads.

said member and having electrical connection with both terminal heads, and means for insulating one of said heads from the shell.

5 11. In a thermal protector, the combination with an inclosing shell, a terminal head secured to one end thereof, a heat concentrating member associated with the opposite end of the shell only, a terminal head fusibly secured to the heat concentrating member, a resistance device associated with the

In testimony whereof I affix my signature
in presence of two witnesses. 15

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